2.2.4 Paleontology

2.2.4.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized or funded projects (e.g., Antiquities Act of 1906 [16 United States Code (USC) 431–433], Federal-Aid Highway Act of 1935 [20 USC 78]). Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA); the California Code of Regulations (formally known as the California Administrative Code), Title 14, Division 3, Chapter 1, Sections 4307 and 4309; and Public Resources Code (PRC) Section 5097.5.

2.2.4.2 Affected Environment

A *Paleontology Report* for the SR-74 Widening project was prepared by the Department's Central Coast Technical Studies Branch in November 2006 (Mills 2006). Subsequently, a Paleontological Identification Report and Paleontological Evaluation Report (PIR/PER) was prepared for the Lower 74 Widening project in May 2008 (Smith 2008), to meet the Department's current Paleontological Guidelines as outlined in Volume 1, Chapter 8, of the Standard Environmental Reference (SER). A summary of these reports is provided below. For more detailed information regarding paleontology, refer to either Mills (2006) or Smith (2008). In addition, in 2002 a report, Final Report Development of a Model Curation Program for Orange County's Archaeological & Paleontological Collections, was prepared for the County that rated the paleontological sensitivity for all geologic units and formations within the County and detailed some of the fossils (if any) that have been recovered from each.

The project study area in both Mills (2006) and Smith (2008) was larger than the proposed ADI by approximately 328 ft (100 meters [m]) on all sides in order to ensure that any design changes would be included in the study. The project study area is set in San Juan Canyon, a northeast-southwest trending canyon formed by San Juan Creek. The SR-74 in the project area is set against the hills that border the northern side of the canyon. Throughout the project area, the elevation ranges from 140 to 283 ft (45 to 86 m). The current road bed elevation ranges from 149 to 162 ft (45 to 49 m).

The following formations underlie the project area according to the geologic map of Orange County, California:

- Quaternary alluvium and colluvium.
- Pleistocene nonmarine terrace deposits.
- Upper Miocene Capistrano Formation.
- Miocene Monterey Formation.

2.2.4.3 Environmental Consequences

Temporary Impacts

No Build Alternative

Since the No Build Alternative does not involve a construction element and there would be no excavation activities, there is no potential for encountering paleontological resources. Therefore, there would be no temporary impact to paleontological resources.

Build Alternatives 1 and 2

There are no temporary impacts to paleontological resources. Any impacts to such resources during construction are considered permanent impacts and are discussed under the permanent impacts heading.

Permanent Impacts

No Build Alternative

Since the No Build Alternative does not involve a construction element and there would be no excavation activities, there is no potential for encountering paleontological resources, and there will be no permanent impacts.

Build Alternative 1 and 2

The potential for sensitive resources to be found in the project area varies depending on the geological unit or formation that will be excavated. Build Alternative 2 would excavate farther into the hillside in areas where two additional retaining walls are required to accommodate the road widening and the replacement sidewalk between Calle Entradero and Via Cordova. Therefore, Build Alternative 2 has a slightly higher probability for encountering sediments that may contain paleontological resources than with Build Alternative 1.

According to Mills (2006), there is low potential for sensitive paleontological resources in the Quaternary alluvium and colluvium as well as the Pleistocene nonmarine terrace deposits. This report also states that there is a high potential for

encountering sensitive resources within the Upper Miocene Capistrano Formation and the Miocene Monterey Formation.

However, according to the Final Report–Development of a Model Curation Program for Orange County's Archaeological & Paleontological Collections (Eisentraut and Cooper, 2002), sensitivity for the nonmarine terrace deposits in Orange County is high. Therefore, all geologic units with the exception of the Quaternary alluvium and colluvium have a high potential for containing paleontological resources. In addition, the results of the Paleontological Investigation Report/Paleontological Evaluation Report (PIR/PER) (Smith 2008) indicated that the sensitivities as reported by Eisentraut and Cooper (2002) are correct, and all sediments except the Quaternary alluvium and colluvium have high paleontological sensitivities.

According to Eisentraut and Cooper (2002) and Smith (2008), Pleistocene nonmarine terrace deposits have produced a variety of terrestrial Ice-Age mammal fossils such as mammoth, bison, horse, camel, sloth, and a variety of birds. Grading in such deposits routinely turns up important Pleistocene fossils. Eisentraut and Cooper (2002) and Smith (2008) report that the Capistrano Formation can contain a diverse collection of marine vertebrates, including fish, shark, whale, dolphin, porpoise, sea lion, sea cow, and sea-going birds, as well as invertebrate remains such as clams, gastropods, sand dollars, and crabs. Finally, Eisentraut and Cooper (2002) and Smith (2008) state that numerous fossil fish, sharks, and marine mammal remains (whales, dolphins, seals, and sea cows) have been recovered from the Monterey Formation. In addition, some areas contain invertebrate remains such as clams, gastropods, sand dollars, and crabs.

All vertebrate fossils are significant, and there is a potential to excavate into several geologic units and formations that contain these significant remains. As the proposed project involves excavating into the hillside on the north side of the SR-74 to build retaining walls, there is no way to avoid excavation into potentially sensitive sediments.

If resources are impacted during construction, those impacts would be considered permanent. In addition, a mitigation plan will be developed to address any significant resources that are encountered during grading activities that would result in permanent impacts. Therefore, the Build Alternatives' permanent impacts to paleontological resources are considered less than significant.

2.2.4.4 Avoidance, Minimization, and/or Mitigation Measures

The Paleontological Mitigation Plan (PMP) must be completed prior to the beginning of construction. Since there is potential to find significant resources within the project limits, the PIR and PER recommended that a PMP needs to be prepared by a qualified Principal Paleontologist. A full list of sections of the PMP is included in the Department's SER Environmental Handbook, Volume 1, Chapter 8.

The following minimization measures would be implemented.

Attendance at the pregrade meeting by a qualified paleontologist or his/her representative. At this meeting the paleontologist will explain the likelihood for encountering paleontological resources, what resources may be discovered, and the methods that will be employed if anything is discovered (see below).

All employees, subcontractors, and Contractor's representatives on the project site involved in subsurface disturbing activities must receive a one-hour paleontological resource awareness training program provided by the Paleontological Salvage Team prior to performing on-site work.

During construction excavation, a qualified vertebrate paleontologic monitor shall initially be present on a full-time basis whenever excavation will occur within the sediments that have a high sensitivity rating and on a spot-check basis in sediments that have a low sensitivity rating. Monitoring may be reduced to a part-time basis if no resources are being discovered in sediments with a high sensitivity rating (monitoring reductions and when they occur will be determined by the qualified Principal Paleontologist). The monitor shall inspect fresh cuts and/or spoils piles to recover paleontological resources. The monitor shall be empowered to temporarily divert construction equipment away from the immediate area of the discovery. The monitor shall be equipped to rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the Department shall consider using heavy equipment on site to assist in the removal and collection of large materials.

Localized concentrations of small (or micro-) vertebrates have the potential to be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened through one-eighth to one-twentieth-inch mesh screens to determine whether microfossils are present. If microfossils are encountered, additional sediment samples (up to 3 cubic yards or 6,000 pounds) shall

be collected and processed through one-twentieth-inch mesh screens to recover additional fossils.

Any recovered specimens shall be prepared to the point of identification and permanent preservation. This includes the picking of any washed mass samples to recover small invertebrate and vertebrate fossils, the removal of surplus sediment from around larger specimens to reduce the volume of storage for the repository and the storage cost, and the addition of approved chemical hardeners/stabilizers to fragile specimens.

Specimens shall be identified to the lowest taxonomic level possible and curated into an institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens on request. The Department requires that a draft curation agreement be in place with an approved curation facility prior to the initiation of any paleontological monitoring or mitigation activities.

Preparation of a report of findings with an appended, itemized inventory of specimens is required following construction. When submitted to the Lead Agency, the report and inventory would signify completion of the program to mitigate impacts to paleontological resources. The report should also be submitted to the museum repository along with the fossil specimens.

The above listed measures are standard mitigation measures for projects that have the potential to encounter sensitive sediments. During the development of the PMP, additional measures may be added; this list is only meant to provide a summary of what may be involved, as additional documentation is often needed on projects that involve the Department.

2.2.4.5 Level of Significance

The No Build Alternative would have no temporary or permanent paleontological impacts.

The Build Alternatives would have no temporary direct, or indirect impacts and a less than significant permanent direct or indirect impact on paleontological resources.